LSI DOCKET NO. 01-572

CLAIMS:

What is claimed is:

1.   A method for reverse order error correction codes comprising:

      a)   receiving data;

      b)   calculating error correction code syndromes of data;

      c)   calculating error correction code syndromes of errors;

      d)   combining error correction code syndromes of data with error correction code syndromes of errors to form combined syndromes;

      e)   determining whether the data is correctable based on the combined syndromes; and

      f)   correcting the data if the data is correctable.

2.   The method of claim 1, further comprising:

      repeating steps (d) and (e) until the data is correctable.

3.   The method of claim 1, wherein the step of combining error correction code syndromes of data with error correction code syndromes of errors comprises performing an exclusive OR function.

4.   The method of claim 1, wherein the step of combining error correction code syndromes of data with error correction code syndromes of errors comprises combining syndromes for data, a first error, and a second error.

5.   The method of claim 1, further comprising:

      determining whether the data is correctable based on the syndromes of data; and

      calculating the error correction code syndromes of errors if the data is not correctable based on the syndromes of data.

LSI DOCKET NO. 01-572

6.   The method of claim 5, further comprising:

using a subset of partial syndromes in a mini decoder if the data is correctable based on

the syndromes of data.

5   7.   The method of claim 1, further comprising:

providing the corrected data to a constraint decoder.

8.   An apparatus for reverse order error correction codes comprising:

an error correction code syndromes of data generator that generates error correction code

10   syndromes of data for received data;

an error correction code syndromes of errors generator that generates error correction

code syndromes of errors for the received data;

a syndrome combiner, wherein the syndrome combiner combines error correction code

syndromes of data with error correction code syndromes of errors to form combined syndromes;

15   and

an error event corrector that corrects the received data based on the combined syndromes.

9.   The apparatus of claim 8, further comprising:

a Viterbi detector that provides Viterbi data,

20   wherein the error correction code syndromes of data generator generates the error

correction code syndromes of data based on the Viterbi data.

10.   The apparatus of claim 9, further comprising:

matched filters that generate a list of most likely errors and metrics based on the Viterbi

25   data,

wherein the error correction code syndromes of errors generator generates the error

correction code syndromes of errors based on the list of most likely errors and metrics.

11.   The apparatus of claim 8, wherein the syndrome combiner combines error correction code syndromes of data with error correction code syndromes until the data is correctable.

12.   The apparatus of claim 8, wherein the syndrome combiner comprises an exclusive OR

5   function.

13.   The apparatus of claim 8, wherein the syndrome combiner combines syndromes for data, a first error, and a second error.

10   14.   The apparatus of claim 8, further comprising:

a full error correction code decoder that determines whether the received data is correctable based on the combined syndromes.

15.   The apparatus of claim 14, wherein the error event corrector corrects the received data in

15   response to the full error correction code decoder determining that the received data is correctable based on the combined syndromes.

16.   The apparatus of claim 14, further comprising:

a mini error correction code decoder that determines whether the received data is

20   correctable based on the error correction code syndromes of data,

wherein the error event corrector corrects the received data in response to the mini error correction code decoder determining that the received data is correctable based on the error correction code syndromes of data.

25   17.   The apparatus of claim 8, further comprising:

a constraint decoder for constraint decoding the corrected data.

18.   A computer program product, in a computer readable medium, for reverse order error correction codes comprising:

first instructions for receiving data;

second instructions for calculating error correction code syndromes of data;

third instructions for calculating error correction code syndromes of errors;

fourth instructions for combining error correction code syndromes of data with error

5   correction code syndromes of errors to form combined syndromes;

fifth instructions for determining whether the data is correctable based on the combined

syndromes; and

sixth instructions for correcting the data if the data is correctable.

10   19.   The computer program product of claim 18, wherein the fourth an fifth instructions are

repeated until the data is correctable.

20.   The computer program product of claim 18, further comprising:

seventh instructions for providing the corrected data to a constraint decoder.